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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,936	09/09/2003	Richard M. Fastow	AMD-H0561	3102

7590 04/27/2006

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EXAMINER	
NGUYEN, DAO H	

ART UNIT	PAPER NUMBER
2818	

DATE MAILED: 04/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/658,936	FASTOW ET AL.	
	Examiner	Art Unit	
	Dao H. Nguyen	2818	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 March 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,8,10,12,21-23 and 25* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1, 8, 10, 12, 21-23, and 25* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. In response to the communications dated 03/16/2006, claims 1, 8, 10, 12, 21-23, and 25 are active in this application.

Claims 2-7, 9, 11, 13-20, and 24 have been cancelled.

Remarks

2. Applicant's argument(s), filed 03/16/2006, with respect to claims 2-7, 9, 11, 13-20, and 24 have been fully considered, but are moot in view of the new ground(s) of rejection(s).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim(s) 1, and 8 are rejected under 35 U. S. C. § 102 (e) as being anticipated by U.S. Patent No. 6,784,480 to Bhattacharyya.

Regarding claim 1, Bhattacharyya discloses a flash memory cell, as shown in figs. 1, 8, 14, 17, and 18, comprising:

a substrate 102 comprising source and drain regions 104, 106;

a silicon dioxide layer 122 adjoining said substrate 102;

a polysilicon floating gate 118;

a dielectric layer 124 (fig. 1) or 1850&1856 (fig. 18) sandwiched between and adjoining both said silicon dioxide layer 122 and said floating gate 118, said dielectric layer 124 comprising a dielectric material (Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material comprises a metal oxide (see col. 4, lines 26-40; col. 6, lines 23-5);

an oxide-nitride-oxide (ONO) layer 128 adjoining said floating gate 118; and

a control gate 114 adjoining said 0N0 layer 128.

Regarding claim 8, Bhattacharyya disclose the flash memory cell wherein said dielectric layer 1850&1856 (fig. 18) comprises a composite of said metal oxide 1850 and a material 1856 selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate. See further col. 11, line 57 to col. 14, line 9.

5. Claim(s) 10 and 12 are rejected under 35 U. S. C. § 102 (e) as being anticipated by U.S. Patent No. 6,559,007 to Weimer.

Regarding claim 10, Weimer discloses a flash memory array comprising memory cells, as shown in figs. 1-2, wherein a memory cell comprises:

a substrate 20 comprising a source 22 and a drain 24;

a first layer 40 comprising a silicon material;

a tunnel oxide layer 30 sandwiched between and adjoining both said substrate 20 and said first layer 40, said tunnel oxide layer 30 comprising a dielectric material (Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material 30 comprises a metal oxide;

a polysilicon floating gate 50 adjoining said first layer 40;

an oxide-nitride-oxide (ONO) layer 60 adjoining said floating gate 50; and

a control gate 70 adjoining said ONO layer 60. See further col. 4, line 3 to col. 6, line 65.

Regarding claim 12, Weimer discloses the flash memory array wherein said silicon material 40 is selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate. See col. 4, lines 21-50.

Claim Rejections - 35 U.S.C. § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to

a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claim(s) 21-23 and 25 is rejected under 35 U.S.C. 103 (a) as being unpatentable over U.S. Patent No. 6,784,480 to Bhattacharyya in view of U.S. Patent No. 6,559,007 to Weimer; or, alternately, as being unpatentable over U.S. Patent No. 6,559,007 to Weimer in view of U.S. Patent No. 6,784,480 to Bhattacharyya.

Regarding claim 21, Bhattacharyya discloses a flash memory cell, as shown in figs. 1, 8, 14, 17, and 18, comprising:

a substrate 102 comprising source and drain regions 104, 106;

a first layer 122 comprising a first silicon material (SiO_2) and adjoining said substrate 122;

a dielectric layer 124 formed above and adjoining said first layer 122, said dielectric layer 124 comprising a dielectric material (Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material comprises a metal oxide (see col. 4, lines 26-40; col. 6, lines 23-5);

a polysilicon floating gate 118 adjoining said dielectric layer 124;

an oxide-nitride-oxide (ONO) layer 128 adjoining said floating gate 118; and

a control gate 114 adjoining said ONO layer 128.

Bhattacharyya fails to teach a second layer comprising a second silicon material being formed so that the dielectric layer 124 being sandwiched between and adjoining both first and second layers of silicon material.

Weimer discloses a flash memory cell, as shown in figs. 1-2, comprising a substrate 20, a dielectric layer 30 comprising a dielectric material (Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material comprises a metal oxide, and a layer 40 comprising silicon material formed above and adjoining the metal oxide layer 30, and also adjoining a polysilicon floating gate 50 (see col. 4, line 3 to col. 6, line 65).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Bhattacharyya to further include a second layer comprising a second silicon material formed above and adjoining the metal oxide layer 124, as that of Weimer, so that the dielectric layer 124 being sandwiched between and adjoining both first and second layers of silicon material in order to improve the device performance. See col. 6, lines 48-50 of Weimer.

Alternately, regarding claim 21, Weimer discloses a flash memory cell, as shown in figs. 1, 2, comprising:

a substrate 20 comprising a source 22 and a drain 24;

a (second) layer 40 comprising a (second) silicon material;

a dielectric layer 30 sandwiched between and adjoining both said substrate 20 and said (second) layer 40, said dielectric layer 30 comprising a dielectric material

(Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material comprises a metal oxide;

a polysilicon floating gate 50 adjoining said (second) layer 40;

an oxide-nitride-oxide (ONO) layer 60 adjoining said floating gate 50; and

a control gate 70 adjoining said ONO layer 60. See further col. 4, line 3 to col. 6, line 65.

Weimer fails to teach a first layer comprising a first silicon material and adjoining said substrate.

Bhattacharyya discloses a flash memory cell, as shown in figs. 1, 8, 14, 17, and 18, comprising a substrate 102, a first layer 122 comprising a first silicon material (SiO_2) and adjoining the substrate 102, a dielectric layer 124 comprising a dielectric material (Ta_2O_5) having a dielectric constant greater than that of silicon dioxide, wherein said dielectric material comprises a metal oxide, wherein the first layer 122 sandwiched between and adjoining both the substrate 102 and the dielectric layer 124 (see col. 4, lines 26-40; col. 6, lines 23-5).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Weimer so that it would further include a first layer comprising a first silicon material that sandwiched between and adjoining both the substrate and the metal oxide dielectric layer as that of Bhattacharyya in order to

provide appropriate energy barriers to retain the stored charge (see col. 6, lines 6-22, and the abstract of Bhattacharyya).

Regarding claim 22, Bhattacharyya/Weimer discloses t he flash memory cell wherein said first silicon material is selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate. See col. 6, line 23 to col. 7, line 62 of Bhattacharyya; and/or col. 4, line 3 to col. 6, line 59 of Weimer.

Regarding claim 23, Bhattacharyya/Weimer discloses the flash memory cell wherein said second silicon material is selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate. See col. 6, line 23 to col. 7, line 62 of Bhattacharyya; and/or col. 4, line 3 to col. 6, line 59 of Weimer.

Regarding claim 25, Bhattacharyya/Weimer discloses the flash memory cell wherein said dielectric layer comprises a composite of said a metal oxide and a material selected from the group consisting of silicon dioxide, silicon oxynitride and silicon oxynitrate. See col. 6, line 23 to col. 7, line 62 of Bhattacharyya; and/or col. 4, line 3 to col. 6, line 59 of Weimer.

Conclusion

8. **THIS ACTION IS MADE FINAL.** A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dao Nguyen whose telephone number is (571)272-1791. The examiner can normally be reached on Monday-Friday 9:00am - 6:00pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Nelms, can be reached on (571)272-1787. The fax numbers for all communication(s) is (571)273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571)272-1625.

Dao H. Nguyen
Art Unit 2818
April 24, 2006

David Nelms
Supervisory Patent Examiner
Technology Center 2800